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THE SEPARATION OF *TRIMORPHA* (COMPOSITAE: ASTEREAE) FROM *ERIGERON*

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ABSTRACT

The genus *Trimorpha* Cass. (*Erigeron* sect. *Trimorpha*) is resegregated from *Erigeron*. The filiform, eligulate pistillate florets and mature pappus that lengthens past the involucre in *Trimorpha* are not found in *Erigeron*. Also, the outer phyllaries with three, orange nerves, which are characteristic of *Trimorpha*, are known in *Erigeron* in only the three species of sect. *Spinosi*. In these features of the flowers, pappus and phyllaries, *Trimorpha* is more similar and apparently more closely related to *Conyza* than to *Erigeron*. Six new combinations to *Trimorpha* are proposed to accommodate the American taxa: **T. acris** var. **asteroides**, **T. a.** var. **debilis**, **T. a.** var. **kamtschatica**, **T. elata**, **T. lonchophylla** and **T. scotteri**.

KEY WORDS: *Trimorpha, Erigeron*, Asteraceae, New World, systematics.

Erigeron sect. *Trimorpha* (Cass.) DC. includes a group of species set apart from the rest of the genus by the production of two zones of pistillate flowers, an inner zone of ca 1-4 series of eligulate flowers and an outer of 1-3 series of very numerous flowers with short, narrow, often filiform ligules. Cronquist (1943, p. 629) saw sect. *Trimorpha* as "inextricably bound to *Erigeron* ... by the obvious evolutionary line of *E. simplex* Greene, *E. uniflorus* L. (sensu lat.) and *E. alpinus* L., in which *E. simplex* is true *Erigeron*, *E. alpinus* is *Trimorpha*, and *E. uniflorus* is somewhat intermediate." In my view, however, *E. uniflorus* is not intermediate between *Trimorpha* and true *Erigeron*, as discussed below, and the two groups are best regarded as different genera.

Trimorpha is distinguished most conspicuously from all of *Erigeron* by its dimorphic pistillate flowers. At least in some species of *Trimorpha*, the ligules loosely coil at maturity. The plants are mostly perennials from short, fibrous-rooted rhizomes and produce few-flowered capitulescences that vary from loosely cylindrical panicles or racemes to corymbs. In a few species the heads are solitary. The leaves are entire and buds erect. The outer phyllaries

have three orange-resinous veins, a feature characteristic of *Conyza* (sensu Nesom [in press]) but found in *Erigeron* only in the three species of sect. *Spinosi* (Nesom 1989) and a few others in scattered groups. This feature of nervation is sometimes difficult to observe if the phyllaries are dark-colored, but it is distinctive and occurs in every species of *Trimorpha* that I have studied. The pappus in plants of *Trimorpha* also resembles that of *Conyza* in becoming prominently longer at maturity than the involucre, a feature diagnostic of *Conyza* but not found in *Erigeron*.

Erigeron lonchophyllus is a fibrous-rooted annual and, alone in *Trimorpha*, has only a zone of ligulate, pistillate flowers, lacking the inner zone of eligulate flowers. It clearly belongs with *Trimorpha*, however, on the basis of its 3-nerved outer phyllaries and elongated pappus. Because of its relatively specialized habit and duration, I believe the lack of the eligulate flowers is a specialization, reflecting a loss rather than a primitive similarity with true *Erigeron*.

With regard to Cronquist's assertion that *Erigeron uniflorus*, the generitype of *Erigeron* (Nesom 1989), occupies an intermediate position between *Erigeron* and *Trimorpha*, I find that the putative intermediacy of *E. uniflorus* lies only in its narrow ligules. In contrast, the ligules do not coil, the outer phyllaries are 1-nerved, and the pappus does not elongate at maturity, features that clearly link it with *Erigeron* rather than *Trimorpha*.

Trimorpha, then, differs from *Erigeron* in several characters, and in these same characters it is similar to *Conyza*. In my opinion, it is set apart as a genus from *Erigeron* with at least as much justification as *Conyza* and appears to be more closely related to *Conyza*.

Cronquist (1943, p. 631) noted that "In surveying the numerous species which link true *Erigeron* to true *Conyza*, we find that in only one place is there any suggestion of a real break. That is between *Trimorphaea* and *Coenotus*." With Cronquist, I regard *Caenotus* as true *Conyza* (Nesom [in press]). Cronquist also noted (1943, p. 630) that "The differences between *Coenotus* and *Trimorphaea* are not great, but the species of the two groups do not seem intimately related. *Erigeron canadensis*, the most nearly bridging species of the section [*Coenotus*], is scarcely confusable with any species of *Trimorphaea*." The morphologically distinct zones of pistillate flowers are not known from any species of *Conyza*. In addition to this difference, *Conyza* is a genus primarily of the southern hemisphere, though some of its species are more widespread; *Trimorpha* is confined to arctic-alpine or temperate regions of the northern hemisphere, and several species are circumboreal.

An alternative taxonomic treatment of *Trimorpha* would be to recognize it as a well-defined section of *Conyza*. This would emphasize its similarity to *Conyza* but would require a much greater number of nomenclatural combinations than the approach taken here, since at least 40 of the Old World

taxa already have names as *Trimorpha*.

TRIMORPHA Cass., Bull. Sci. Soc. Philom. Paris 1817:137. 1817. TYPE: *Trimorpha vulgaris* Cass. in Cuvier, Dict. Sci. Nat. 55:324. 1828 (=*E. acris* L.). *Trimorphaea* Cass. in Cuvier, Dict. Sci. Nat. 37:462. 1825. *Erigeron* sect. *Trimorpha* (Cass. in F. Cuvier) DC., Prodr. 5:290. 1836. *Erigeron* subg. *Trimorpha* (Cass.) M. Popov, Acta Inst. Bot. Acad. Sci. URSS, Ser. 1, Fasc. 7:10. 1948.

In the original publication of the genus *Trimorpha* (1817), Cassini cited *Erigeron acris* L. as its sole constituent. Not until 1828 did he name a species in the former genus, and there he cited *E. acris* as a synonym of *T. vulgaris*. In 1825, Cassini began using the orthographical variant *Trimorphaea*, listing the original *Trimorpha* as a synonym. I have discussed other aspects of the lectotypification of *Erigeron* and *Trimorpha* in a separate paper (Nesom 1989).

Trimorpha sect. *Brachyglossae* Vierh., Beih. Bot. Centralbl. 19:423. 1906. LECTOTYPE (designated here): *T. acris* (L.) S.F. Gray (=*Erigeron acris* L.).

Trimorpha sect. *Macroglossae* Vierh., Beih. Bot. Centralbl. 19:424. 1906. LECTOTYPE (designated here): *T. alpina* (L.) S.F. Gray (=*Erigeron alpinus* L.).

Erigeron (sp.-group) *Acres* Rydb., Fl. Colorado 359.1906, in clave. TYPE: *E. acris* L.

Tessenia P. Bubani, Fl. Pyrenaea 2:264. 1899. LECTOTYPE (designated here): *Tessenia alpina* (L.) P. Bubani (=*Erigeron alpinus* L.).

Tessenia was a superfluous and substitute name for *Erigeron* by Bubani. It was later used by Lunnell (1917).

There are about 40-45 North American and Eurasian species in *Trimorpha*. The whole group is in need of critical taxonomic study. From Eurasia, Vierhapper (1906) treated *Trimorpha* as a genus and included 26 species; Botschantzev (1959) included 17 species in *Trimorpha* as a subgenus of *Erigeron*. In Flora Europaea (Tutin et al., 1976), nine species are treated as *Erigeron*. From North America, Cronquist (1947) recognized only two species in *E.* sect. *Trimorpha, E. lonchophyllus* and *E. acris*, the latter with several varieties. In his study of the Alaskan flora, where all the American taxa of *Trimorpha* occur, Hultén (1968b) recognized *E. elatus (E. acris* var. *elatus* sensu Cronquist) as a distinct species and added one taxon (*E. acris* var. *kamtschaticus*) known from a single collection on the Alaska-Yukon boundary. I propose combinations to *Trimorpha* for the American taxa as recognized by Hultén, leaving the taxonomy of the Old World species for botanists better acquainted with those species.

NEW WORLD AND CIRCUMBOREAL TAXA

Trimorpha acris (L.) S.F. Gray, Nat. Arr. Brit. Pl. 2:466. 1821. *Erigeron acris* L., Sp. Pl. 863. 1753.

Trimorpha acris var. **debilis** (A. Gray) Nesom, comb. nov. *Erigeron acris* var. *debilis* A. Gray, Syn. Fl. N. Amer. 1(2):220. 1884. *Erigeron debilis* (A. Gray) Rydb., Mem. N.Y. Bot. Gard. 1:408. 1900.

Trimorpha acris var. **kamtschatica** (DC.) Nesom, comb. nov. *Erigeron kamtschaticus* DC., Prodr. 5:290. 1836. *Erigeron acris* subsp. *kamtschaticus* (DC.) Hara, J. Jap. Bot. 15:317. 1939. *Erigeron acris* var. *kamtschaticus* (DC.) Herder, Bull. Soc. Nat. Moscou Sect. Biol., Ser. 2. 38:392. 1865.

Trimorpha acris var. **asteroides** (Andrz. ex Besser) Nesom, comb. nov. *Erigeron asteroides* Andrz. ex Besser, Enum. Pl. Volh. 33. 1822. *Erigeron acris* var. *asteroides* (Andrz. ex Besser) DC., Prodr. 5:290. 1836. *Erigeron politus* E. Fries, Summa Veg. Scand. 3:184.1845. *Erigeron acris* subsp. *politus* (E. Fries) H. Lindb. f., Enum. Pl. Fennoscand. Orient. 56. 1901; non Schinz & Keller, 1909.

Hultén (1968a) suggested that *Erigeron asteroides* was not known from America. By the publication of his flora (1968b), however, he had apparently changed his mind, because he included *E. acris* var. *asteroides* as a synonym of *E. acris* subsp. *politus*.

Trimorpha elata (Hook.) Nesom, comb. nov. *Erigeron alpinus* γ *elatus* Hook., Fl. Bor. Amer. 2:18. 1834. *Erigeron elatus* (Hook.) E. Greene, Pittonia 3:164. 1897. *Erigeron acris* var. *elatus* (Hook.) Cronq., Brittonia 6:296. 1947.

I accept Cronquist's argument (1947, p. 297) that Hooker's varietal name is valid and that Greene's name is homotypic and synonymous with it.

Trimorpha lonchophylla (Hook.) Nesom, comb. nov. *Erigeron lonchophyllus* Hook., Fl. Bor. Amer. 2:18. 1834.

Trimorpha scotteri (B. Boivin) Nesom, comb. nov. *Erigeron scotteri* B.Boivin, Phytologia 23:52. 1972.

According to Boivin (1972), *Trimorpha scotteri* includes plants that were suggested by Cronquist (1947) to be hybrids between *Erigeron humilis* Grah. and *T. acris* var. *debilis*.

REPRESENTATIVE OLD WORLD TAXA

Trimorpha alpina (L.) S.F. Gray, Nat. Arr. Brit. Pl. 2:467. 1821. *Erigeron alpinus* L., Sp. Pl. 864. 1753.

Trimorpha attica (Vill.) Vierh., Beih. Bot. Centralbl. 19:462. 1906. *Erigeron atticus* Vill., Hist. Pl. Dauph. 3:237. 1788 (incl. *E. villarsii* Bellardi).

Trimorpha borealis Vierh., Beih. Bot. Centralbl. 19:447. 1906. *Erigeron borealis* (Vierh.) Simm., Lunds Univ. Arsskr. n.s. 9:127. 1913.

Trimorpha epirotica Vierh., Beih. Bot. Centralbl. 19:446. 1906. *Erigeron epirotica* (Vierh.) Halacsy, Consp. Fl. Graec., Suppl. 53. 1908.

Trimorpha neglecta (A. Kerner) Vierh., Beih. Bot. Centralbl. 19:451. 1906. *Erigeron neglectus* A. Kerner, Osterr. Bot. Zeitschr. 21:253. 1871.

Erigeron orientalis Boiss., Diagn. Pl. Orient. Nov. 3:7. 1856. Apparently no name as *Trimorpha*.

Trimorpha podolica (Besser) Vierh., Beih. Bot. Centralbl. 19:423. 1906. *Erigeron podolicus* Besser, Enum. Pl. Volh. 76. 1822.

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